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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,323	05/10/2001	Takeshi Hoshida	064731.0183	5870

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EXAMINER	
NGUYEN, CHAU M	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/853,323	HOSHIDA ET AL.	
	Examiner	Art Unit	
	Chau M Nguyen	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *032904 & 091404*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action is in response to the Amendment (Remarks) filed on 05 August, 2004.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6, 8, 9, 11-18, 20, 21, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano (U.S. Pat. No. 6,310,709 B1) in view of DU et al. (U.S. Pat. No. 6,417,958 B1).

As claims 1, 13 and 23, Bergano discloses system and method for transmitting information in an optical communication system, comprising:

an optical sender (fig. 1) for modulating a non-intensity characteristic (by numerical 102 and/or 108, col. 2, lines 37-41) of an optical carrier signal (101) with a data signal (116) to generate an optical information signal;

an optical link (at output of 108) for transmitting the optical information signal over an optical link (col. 2, lines 25-48);

Bergano does not shows a distributed amplifier for amplifying the optical information signal over a length of the optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link.

However, DU discloses (fig. 4) a co-propagating Raman amplifier (35 and/or 38, col. 7, line 27-30) for amplifying the optical information signal over a length of the optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link (col. 1, lines 21-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to apply a co-propagating amplifier on the transmission line as taught by DU into the transmission line of Bergano in order to raise the signal to wanted level. One would have motivated for doing this since co-propagating amplifier reduces cross-talk as well (DU, col. 3, lines 65-67).

As claims 2 and 14, the modified system as a combination of Bergano and DU, as applied in the claims 1 and 13, does not clearly show the co-launched amplification signal travels at a substantially same speed as the optical information signal. However, DU discloses the relationship between the amplification signal speed and the optical information speed in that, the speed difference might produce the walk-off of information in time (DU, col. 1, line 63 – col. 2, line 3). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to apply the relationship between the amplification signal and optical information signal (equation, col. 6) as taught by DU to setup the two signals (amplification signal and information signal)

having substantially same speed in order to obtain the best cross-talk bandwidth in the system (DU, col. 2, lines3, 5).

As claims 3 and 15, DU, (col. 7, lines 32-34) shows the wavelength of amplification signal is lower than the wavelength of the optical information signal.

As claims 4 and 16, DU discloses the optical information signal is amplified over the length of the optical link with the co-launched amplification signal by distributed Raman amplification (DRA) (See figure 4).

As claims 5 and 17, DU further discloses (See figs. 11 and/or 12):

the optical sender operable for generating a plurality of optical information signals each comprising a wavelength distinct carrier signal having the non-intensity characteristic modulated with a data signal (col. 10, lines 11-14);

multiplexer (140) for multiplexing the plurality of optical information signals to generate a wavelength division multiplexed (WDM) signal (col. 11, lines 14-17);

and transmitting the WDM signal over the optical link (by 160 and 200); and

the distributed amplifier (33, fig. 4) for amplifying the WDM signal over the length of the optical link (by 220) with a plurality of co-launched amplification signals transmitted in the same direction as the WDM signal (col. 10, lines 30-32).

As claims 6, 18 and 24, Bergano discloses the phase of the optical carrier signal being modulated with the data signal (col. 2, lines 37-38).

As claims 8 and 20, DU teaches amplifying the optical information signal (by 400, See figure 12) over a second length of the optical link with a counter-launched amplification signal traveling in an opposite direction as the optical information signal and the co-launched amplification signal (col. 10, lines 49-56).

As claims 9 and 21, DU also discloses the optical information signal and the co-launched amplification signal travel in the first direction, further comprising (fig. 12):

a second optical sender for modulating the non-intensity characteristic of a second optical carrier signal with a second data signal (denoted by $S'_1,\ldots, S'_N$) to generate a second optical information signal;

the optical link operable to transmit the second optical information signal over the optical link in a second direction opposite the first direction; and

the distributed amplifier (220) for amplifying the first and second optical information signals over the length of the optical link with the co-launched amplification signal and a counter-launched amplification signal traveling in the second direction (col. 10, lines 37-46) (col. 1, lines 19-21).

As claims 11 and 12, DU shows amplifying the signal in the optical link with an erbium-doped fiber amplifier (col. 7, lines 27-28).

4. Claims 7, 10, 19, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano (U.S. Pat. No. 6,310,709 B1) in view of DU (U.S. Pat. No.

6,417,958 B1) as applied in the independent claims 1, 13 and 23, in view of Bergano (Hereinafter " Bergano '326") (U.S. Pat. No. 6,556,326 B2).

As claims 7, 19, and 25, the modified system as a combination of Bergano and DU does not clearly show the frequency (as cited in claims 7, 19 and 25) of the optical carrier signal to be modulated with data. However, Bergano '326 discloses the optical signal is phase and/or frequency modulated (Bergano '326, fig. 4, col. 5, lines 39-45). Therefore, it would have been obvious to one having ordinary skill in the art to use a phase and/or frequency modulator as taught by Bergano '326 into the combination optical communication system (Bergano and DU) for modulating the optical carrier with the optical data. One would have been motivated for doing this since it provides the synchronization between sender and receiver of a long-distance optical transmission system, in turns, the signal is more tolerant to the distortions (Bergano '326, col. 2, lines 27- 31 and lines 37-40).

As claims 10 and 22, the modified system of Bergano and DU, as described in the independent claims 1 and 13, in that the system comprising the co-launched amplification signal operable to amplify the signal over the length of the optical signal (col. 10, lines 27-32) (col. 1, lines 21-23).

The modified system differs from the claimed invention:

the optical sender operable to remodulate the optical information signal with a transmission clock frequency using an intensity modulator to generate a multimodulated signal; and

the optical link for transmitting the multimodulated signal; as cited in the claimed invention.

However, Bergano '326 discloses:

the optical sender operable to remodulate the optical information signal with a transmission clock frequency using an intensity modulator (107, figure 1) to generate a multimodulated signal (col. 2, lines 27-37; col. 5, lines 50-53); and

the optical link (108) for transmitting the multimodulated signal (col. 4, lines 18-24).

Therefore, it would have been obvious to one having ordinary skill in the art to use an intensity modulator for remodulating the optical signal as taught by Bergano '326 into the combination system of Bergano and DU in order to generate a multimodulated signal. One would have been motivated for doing this since by providing the multimodulated signal (including the clock signal), the clock frequency is then synchronously transmitted with the signal. The resulting signal is more tolerant to the distortions usually found in light wave transmission system, thus giving superior transmission performance. (Bergano '326, Abstract).

5. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over DU (U.S. Pat. No. 6,417,958 B1), in view of Bergano '326 (U.S. Pat. No. 6,556,326 B2).

As claim 26, DU discloses a method for transmitting information in an optical communication system, comprising:

modulating one of each of a plurality of wavelength distinct carrier signals with a data signal to generate an optical information signal (col. 7, lines 61-63);

multiplexing the optical information signals to generate a wavelength division multiplex (WDM) signal (col. 7, line 12) ;

transmitting the WDM signal over an optical link (36, fig. 4); and

amplifying the WDM signal in the optical link using distributed Raman amplification (DRA) with a co-launch pump signal (1080, fig. 13) traveling in the same direction as a WDM signal and a counter-launch pump signal (1090) traveling in an opposite direction as the WDM signal (col. 1, lines 10-15).

DU does not clearly show the modulating using one of a phase and frequency. However, Bergano discloses the method for modulating using one of phase and frequency (Bergano '326, fig. 4, col. 5, lines 41-44). Therefore, it would have been obvious to one having ordinary skill in the art to use one of a phase and frequency to modulate the optical data signal as taught by Bergano '326 into the optical system of DU in order to generate the optical information system. One would have motivated to do this since the by modulating phase and frequency, the signal becomes synchronous in which, improved the noise figure and increased the transmission distance. (Bergano '326, col. 7, lines 2-3).

Response to Arguments

6. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chraplyvy et al. (U.S. Pat. No. 6,381,048 B1) is cited to show WDM system having reduced cross-phase modulation.

Bai (U.S. Pat. No. 6,735,395 B1) is cited to show WDM communication system utilizing WDM optical sources with stabilized wavelengths and light intensity and method for stabilization thereof.

Frankel et al. (U.S. Pat. No. 6,496,297 B1) is cited to show device and method for modulating an optical signal.

Miyata et al. (U.S. Pat. No. 6,366,376 B1) is cited to show optical transmitting device using WDM to transmit signal lights having frequencies arranged to eliminate effects of four-wave mixing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chau M Nguyen whose telephone number is 571-272-3030. The examiner can normally be reached on Mon-Fri from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

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C.M.N.
Oct. 22, 2004